

## Larval morphology of *Ectemnostega (Ectemnostegella) montana* (Lundblad 1928) (Hemiptera: Heteroptera: Corixidae: Corixinae), with an emphasis on chaetotaxy

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### Abstract

The genus *Ectemnostega* Enderlein comprises two subgenera, *Ectemnostega* and *Ectemnostegella*. The subgenus *Ectemnostegella* is distributed in the mountainous areas of Argentina, Bolivia, Chile, and Perú. *Ectemnostega (Ectemnostegella) montana* (Lundblad 1928), the type species of the subgenus, presents a wide distribution from Perú and Bolivia to northwestern Argentina in the provinces of Salta, Jujuy, Tucumán, Catamarca, and Córdoba. The egg and all five instars of *E. (E.) montana* are presented for the first time. They are described and illustrated with an emphasis on the morphometry of selected structures and chaetotaxy. The five instars can be separated by means of morphometric relationships and chaetotaxy of the pterothorax, the three pairs of legs, and the abdominal sternites. Comparisons with other species of Corixidae known as larvae are included. The species is recorded from San Luis Province, Argentina, for the first time.

**Key words:** water boatmen, eggs, larvae, Corixinae, larval morphology, chaetotaxy, morphometry

### Introduction

The water boatmen are known to inhabit shallow areas of lotic waters, and temporally stable lentic environments with abundant submerged aquatic macrophytes. The high dispersal potential of this group allows the insects to use many unstable and temporary habitats (Stonedahl & Lattin 1986).

Most corixids are detritivores or microphagous scavengers; some species, however, are largely predaceous and feed on zooplankton, insect larvae, and oligochaetes. They deposit their eggs below the surface of the water, on aquatic plants, stones or woody debris. The eggs of Corixidae have been studied by Poisson (1935), Hungerford (1948a, b), and Cobben (1968).

The genus *Ectemnostega* Enderlein comprises two subgenera: *Ectemnostega*, including only the type species *E. (E.) quadrata* Signoret; and *Ectemnostegella* including ten species. *Ectemnostega (Ectemnostegella)* can be easily distinguished by the presence of several spinules on the ventral region of the profemur, the regular posterior border of the sternite VII of females (not excavated as in the other subgenus), the male protibiae without a carina covering the basal region of tarsus, and the distal half of hemelytra only slightly expanded. This subgenus is distributed in the mountainous areas of Argentina, Bolivia, Chile, and Perú, from 1000 to over 4000 m above sea level (Bachmann 1981).

*Ectemnostega (E.) montana* Lundblad, the type species of the subgenus, presents a wide distribution from Perú and Bolivia to northwestern Argentina in the provinces of Salta, Jujuy, Tucumán, Catamarca, and Córdoba. According to Bachmann (1981), this species shows hemelytral polymorphism; the most common form is the brachypterous.

Most previous studies on larval morphology are of a single species, and none of them includes details on the chaetotaxy.

Here we describe the egg and the five instars of *E. (E.) montana* with a detailed description of the chaetotaxy, including MEB photographs and line drawings of the structures described. We believe that describing the egg and the larvae in detail will enable others to distinguish other eggs and larvae more readily.

## Materials and methods

**Source of material.** Adults and larvae of *E. (E.) montana* were collected in the field, fixed, and preserved in 96% ethyl alcohol. The eggs were obtained by dissection from females.

**Methods.** The taxonomic descriptions of the eggs and the five instars were performed using a Leitz stereomicroscope. For each instar only differences with the subsequent instar description are emphasized. Larval specimens were cleared in lactic acid for several days, dissected, and mounted on standard glass slides with Hoyer's medium (polyvinyl-lacto-glycerol). Observation, drawings, and further examination for the resolution of the chaetotaxy of antennal segments, legs, thorax, and abdomen, and other small structures, were made using an Olympus CX31 compound microscope equipped with a drawing tube. Spines, hairs, trichobothria, and campaniform sensilla on the antennal segments and legs were analyzed with regards to their position on each segment. Drawings were scanned and digitally edited. To illustrate the different kinds of setae, spines, and other structures, an air-dried fifth instar was mounted on a metallic holder, sputter-coated with Au-Pd alloy, and examined using a Jeol 6361 LV scanning electron microscope. The specimens were photographed using a Zeiss stereomicroscope equipped with a digital camera.

The material is held in the larval collection of S. A. Konopko (Laboratory of Entomology, Buenos Aires University, Argentina); voucher specimens are deposited in the Entomological Collection of La Plata Museum (Argentina).

**Morphometric analysis.** Alcohol-preserved material was observed in a watch glass with 96% ethyl alcohol. Larval structures to be measured were adjusted as parallel as possible to the plane of the objective, utilizing a Leitz stereomicroscope equipped with a micrometric ocular. Paired structures of each individual were considered independently.

The following measurements were taken: Egg length (EL): measured as the greatest distance across the egg, excluding the stalk. Egg width (EW): measured across the widest point of the egg. Body length (BL): measured along midline from the anterior margin of the mesonotum to the end of the abdomen. Body width (BW): measured across the widest point of the specimen, usually across the metathorax. Head length (HL): measured along midline from anterior to posterior margin. Head width (HW): measured as the greatest distance across the head, marked by the outer (basal) margins of the eyes. Synthlipsis (S): measured as the distance between the inner margins of eyes. Width of an eye (eW): measured from the inner hind margin to the outer margin of an eye. Ocular index (OI) (Nieser 1977): calculated as two times the synthlipsis, divided by the width of head across eyes, minus the synthlipsis. Length of antenna (AL): derived by adding the length of the antennal segments I (A1) and II (A2). Width of the antennal segment II: measured across the widest point of the structure. Length of pterothorax (PL): measured along midline from the anterior margin of the mesothorax to the posterior margin of the metathorax. Length of leg (L): was obtained by adding the length of the segments: femur (FE), tibiarsus (TITA) or tibia (TI) and tarsus (TA); each leg is denoted by the letter L followed by a number (e.g., L1: anterior leg). The anterior legs of the larvae studied are considered to be composed of five elements: coxa (CO), trochanter (TR), femur (FE), tibiarsus (TITA), and claw (CL); and the meso- and metalegs of six elements (coxa, trochanter, femur, tibia (TI), tarsus (TA), and claws (CL1 and CL2). The segment of each leg is denoted by the corresponding letters followed by the number of the leg (e.g., FE1: profemur). Metaxyphus length (ML): measured along midline from anterior to posterior margin. Metaxyphus width (MW): measured across the widest point of the structure. Distance between the scent gland openings in segments III, IV, and V (G3, G4, and G5, respectively). Scent gland openings diameter in

segments III, IV, and V (D3, D4, and D5, respectively). Measurements are given in millimetres, the ranges and means (enclosed in brackets) are included for each feature and are shown in Table 1. Several individual measurements were used to calculate ratios as ranges for each instar, which characterize body shape. The following individuals were measured: 3 instar I, 1 instar II, 2 instar III, 3 instar IV, and 3 instar V.

**TABLE 1.** Measurements of immature stages of *Ectemnostega (Ectemnostegella) montana* (Lundblad).

	Instar I (n= 3)	Instar II (n= 1)	Instar III (n= 2)	Instar IV (n=3)	Instar V (n= 3)
Body length	1.25–1.35 (1.30)	1.80	2.40–2.50 (2.45)	3.35–3.50 (3.45)	5.20–5.50 (5.33)
Body width	0.88–1.05 (0.93)	1.30	1.35–1.55 (1.45)	2.00–2.10 (2.03)	2.50–3.00 (2.73)
Head length	0.20–0.23 (0.21)	0.40	0.50	0.55–0.60 (0.58)	0.80–1.00 (0.90)
Head width	0.75–0.80 (0.77)	1.05	1.40–1.45 (1.43)	1.80–1.85 (1.83)	2.40–2.50 (2.47)
Synthlipsis	0.38–0.43 (0.40)	0.40	0.55–0.70 (0.63)	0.65–0.75 (0.72)	0.80–1.00 (0.90)
Eye width	0.18–0.20 (0.18)	0.30	0.40–0.45 (0.43)	0.60–0.70 (0.65)	0.90–1.00 (0.97)

## Results

**Material examined.** ARGENTINA: Córdoba, Yacanto de Calamuchita, Arroyo Yacanto, 1200 m a.s.l., 19-X-2008, S.A. Konopko coll. (42 dissected eggs, 26 instar I, 7 instar II, 4 instar III, 8 instar IV, 9 instar V). San Luis, Merlo, Arroyo San Miguel, Cortaderas, 32°32'43.11" S - 64°57'57.19" W, 27-X-2008, M.C. Melo coll. (8 instar III, 24 instar IV, 48 instar V).

**Eggs** (n= 6). Eggs were dissected from females, which contained 13–15 eggs each.

EL: 0.93–1.03. EW: 0.73–0.78. Shape subsphaerical, E (L/W): 1.27–1.34, flattened at one side, with a very short stalk. Colour yellow, micropylar process and stalk transparent. Surface ornamented by irregular interlocking hexagons and other irregular geometric forms.

**First instar** (Figs. 1, 6, 14–15, 18, 21) (n= 6). **Colour.** Most of body brown with dark markings; setae on terga and pleura dark, those on sterna pale. Head brown, except ecdysial line and ventral and lateral regions paler. Eyes reddish brown. Rostrum light brown, except distal article darker. Antenna light brown, with dark setae. Pronotum darker on anterior lateral margins, interrupted medially by a pale area. Meso- and metanotum darker on anterior margin and medially. Acetabulae and thoracic sterna light brown. Legs light brown, with dark setae; except posterior distal region of profemur, anterior distal region of mesotarsus and claws, posterior distal region of mesofemur, mesotibia, mesotarsus, and claws, and posterior distal region of metafemur, metatibia, metatarsus, and claws darker. Abdominal terga brown with darker patches; first scent gland dark brown, second and third scent glands reddish brown; abdominal sternites light brown, except proctiger darker. Laterotergites brown with darker patches on posterior margins of each segment.

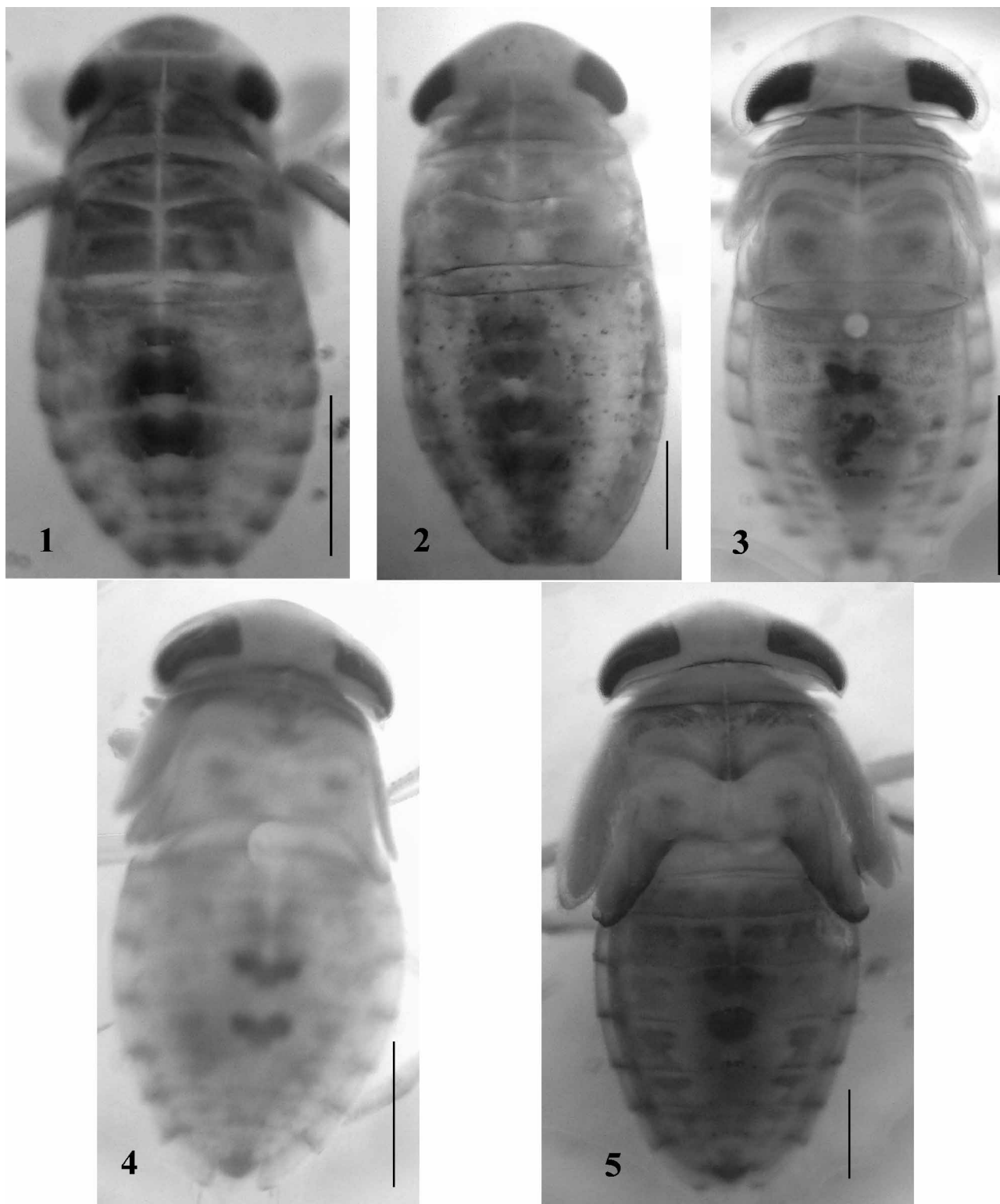
**Body.** Elongate oval, ratio BL/BW: 1.19–1.54 (Fig. 1).

**Head.** head short, ratio of HL/HW: 0.25–0.30; anterior margin rounded, posterior margin concave; ecdysial line T-shaped; frons with trichobothria and long slender setae; clypeous with short and long slender setae; dorsal and posterior regions with trichobothria and microtrichia. S/eW: 2.13–2.28. OI: 2.00–2.28. HW/BL: 0.56–0.64. **Rostrum** short, with three transverse sulcations. **Antenna** bisegmented, short, AL/BL: 0.13–0.16; A1:A2=0.17–0.33:1.00; segment I subconical, with microtrichia, anterior region with a campaniform

sensillum; segment II subcylindrical and fusiform, ratio of A2 width/length: 0.33, with microtrichia, anterior region with a set of short stiff spines, and long slender spines on distal half, antero-ventral region with a campaniform sensillum.

**Thorax.** *Pronotum* subrectangular and short, anterior margin slightly concave, lateral margins convex, and posterior margin straight; with microtrichia and a few long slender setae on posterior half. Prosternal posterior margin slightly convex; with microtrichia, and a few short slender setae. *Mesonotum* short, shorter than metanotum and of similar length or shorter than pronotum; lateral margins convex; posterior margin convex at middle; with a few long setae, and microtrichia. Posterior margin of mesosternum slightly convex, with a few short slender setae, and microtrichia. *Metanotum* longer than pro- and mesonotum; posterior margin slightly concave; with a few long slender setae on posterior half; with microtrichia. Posterior margin of metasternum slightly convex, with a few short slender setae; with microtrichia. Wing pads absent. PL/BL: 0.24–0.27. Meso- and metathoracic spiracles small and rounded, located ventrally near posterior margin of each segment. Ecdysial line visible on pro-, meso- and metanotum. *Anterior leg* (Fig. 6) short, L1/BL: 0.46–0.50; profemur shorter than tibiatarisus, FE1/TITA: 0.67–0.79; with microtrichia. *Procoxa* short and subconical; anterior region with two long slender setae, and three shorter ones basally; antero-ventral region with one long slender setae apically; antero-dorsal and postero-dorsal regions with chloride cells. *Protrochanter* short; anterior region with two short setae basally, five (2+1+1+1) short slender setae medially, one long slender setae apically, and three (2+1) campaniform sensilla basally; posterior region with two campaniform sensilla, one medially and other apically. *Profemur* short and stout, subrectangular; anterior region with seven spines (three short and slender, four long and stout), two long stout spines apically, basal hydrophobic setose area absent; antero-dorsal region with two long stout spines apically; antero-ventral region with a short slender spine basally, and a long stout spine apically; posterior region without basal hydrophobic setose area; postero-ventral region unarmed; dorsal region with two short slender setae on basal half, three long slender spines, one long slender setae, and chloride cells. *Tibiatarisus* or pala spoon-shaped, elongate, and slightly curved apically, ratio of TITA width/length: 0.29–0.36; dorsal row with 7–9 long slender setae; upper row with 16–19 short stout spines; lower row with 12–14 long slender spines; anterior region with tibial comb represented by two slender spines (one short, one long), basal region of tibiatarisus with a long slender spine; antero-dorsal region with 1–2 short stout spines; antero-ventral region with two short slender spines. One short, stout, and falcate claw present. CL length: 0.11. *Mesolegs* (Figs. 14–15) long and slender; L2/BL: 1.00–1.04; mesofemur longer than mesotibia, mesotibia shorter than mesotarsus; FE:TI:TA= 1.00:0.46–0.52:0.54–0.60; with microtrichia. *Mesocoxa* short, subconical; anterior region with a short slender setae, one long slender setae apically, and three short setae basally; posterior region with a short slender setae; postero-ventral region with three long slender setae; antero-dorsal and postero-dorsal regions with chloride cells. *Mesotrochanter* short; anterior region with three campaniform sensilla basally, one short stout spine, and two short slender setae apically; posterior region with three campaniform sensilla medially; postero-dorsal region with two long slender setae basally; postero-ventral region with three long slender setae basally, and one long slender setae apically. *Mesofemur* subcylindrical; anterior region with one short spine basally; antero-dorsal region with nine slender spines of different length, two long stout spines apically, and chloride cells; antero-ventral region with ten stout spines of different length, and two long stout spines apically, with chloride cells; postero-dorsal region with one long stout spine apically; postero-ventral region with three short stout spines, and chloride cells; ventral region with seven slender spines of different length. *Mesotibia* subcylindrical; anterior region with a row of five short slender spines, and one long slender spine basally; antero-dorsal region with one long slender spine apically, and a long slender setae; antero-ventral region with six short slender spines, and one long slender spine apically; posterior region with one row of six short slender spines, five long slender setae, one short slender spine, and one long slender spine apically; postero-dorsal region with two short slender spines; postero-ventral region with two short slender spines on apical half, and one long slender spine apically. *Mesotarsus* subcylindrical; anterior region with one row of four short slender spines, 1–2 long slender spines apically; antero-dorsal region with one campaniform sensillum basally, one short slender spine basally, and one long slender setae apically; ventral region with ten short slender spines;

posterior region with one row of six slender spines (three short and three long), and one long slender spine apically; postero-dorsal region with seven long slender setae, and four short slender spines. Two long falcate claws of different length. CL1 length: 0.36; CL2 length: 0.39; TA2/CL1: 0.90; TA2/CL2: 0.97. *Metalegs* (Fig. 18) long and slender, L3/BL: 1.17–1.24; metatarsus long, metatibia shorter than metafemur; FE:TI:TA=0.61–



**FIGURES 1–5.** Dorsal view of immature stages of *Ectemnostega* (*Ectemnostegella*) *montana* (Lundblad). **1**—First instar; **2**—Second instar; **3**—Third instar; **4**—Fourth instar; **5**—Fifth instar. Scale bars: Figs. 1–2= 0.50 mm, Figs. 3–5= 1.00 mm.

0.74:0.54–0.61:1.00; with microtrichia. *Metacoxa* large, subconical; anterior region with two short slender spines, and two slender spines apically (one short and one long); antero-dorsal region with chloride cells; antero-ventral region with one short slender spine; postero-ventral region with one short slender spine apically. *Metatrochanter* short; anterior region with one short slender spine, three campaniform sensilla basally, and two short setae basally; antero-ventral region with two long slender setae basally; posterior region with two campaniform sensilla basally, and one short setae medially; postero-dorsal region with two long slender setae basally; postero-ventral region with two short slender setae. *Metafemur* slightly curved and compressed antero-posteriorly; basal hydrophobic setose area absent, one upper row of three short stout spines, one lower row of five short slender spines, and three short slender spines apically; antero-dorsal region with short and long slender setae, and chloride cells; antero-ventral region with chloride cells; posterior region with 10–11 short stout spines, basal hydrophobic setose area absent (Fig. 21); postero-dorsal region with two short stout spines apically, and chloride cells; postero-ventral region with chloride cells. *Metatibia* subcylindrical, ratio of TI3 width/length: 0.24–0.27; anterior region with two rows of slender spines (upper row with six long spines, and lower row with ten short spines); antero-dorsal region with nine long slender spines; posterior region with seven long slender setae and a row of seven slender spines (three short and four long); postero-ventral region with eight short stout spines, and the tibial comb including two long slender spines. *Metatarsus* compressed antero-posteriorly, slightly curved; ratio of TA3 width/length: 0.11; anterior region with a row of 23–25 long, slender setae, one row of 8–9 long slender spines, and one long slender spine apically; posterior region with an upper row of 5–6 long slender setae, and a lower row of 30–31 long slender setae; postero-dorsal region with a campaniform sensillum basally, 17–19 long slender spines, and a long slender spine apically; postero-ventral region with a row of 19 long slender spines. Two long straight claws of different length present. CL1 length: 0.25; CL2 length: 0.26; TA3/CL1: 2.69; TA3/CL2: 2.80.

**Abdomen.** Posterior lateral margin of each segment slightly concave dorsally and ventrally; with three heart-shaped scent glands (segments III, IV, and V), G3: 0.06–0.08; G4: 0.13–0.15; G5: 0.13; D3: 0.01; D4: 0.03; D5: 0.03; spiracles visible on segments II–VII, small and rounded, located ventrally near posterior margin of each segment. Terga with microtrichia and chloride cells; with short and long slender setae; segment III with a pair of long slender setae by the sides of scent gland openings; segments IV and V with a pair of long slender setae posteriorly to scent glands openings and near posterior margin of each segment; segments VI and VII with a pair of long slender setae on posterior margin of each segment. Lateral setae on abdominal segments II–VIII (right side); II–III: one short setae; IV: one long slender setae, and one median slender setae; V: three short setae, one long slender setae, and one median slender setae; VI–VII: three short setae, and one long slender setae; VIII: one short setae, five long slender setae, one median slender setae, and one short setae on posterior margin of the segment. Sternum with scattered short slender setae; with chloride cells on every segment forming paired patches on each one; with microtrichia. Abdominal sterna chaetotaxy: sternite IV with four spines (two short at middle and two long lateral); sternite V with five spines (3 short lateral and two long at middle); sternite VI with four spines (2 short lateral and two long at middle); sternites VII–VIII with two long spines medially. The spines belonging to sternites IV, V, and VI located near posterior margin of each segment, and those of sternites VII and VIII located near anterior margin of each segment.

**Second instar** (Figs. 2, 9) (n = 2)

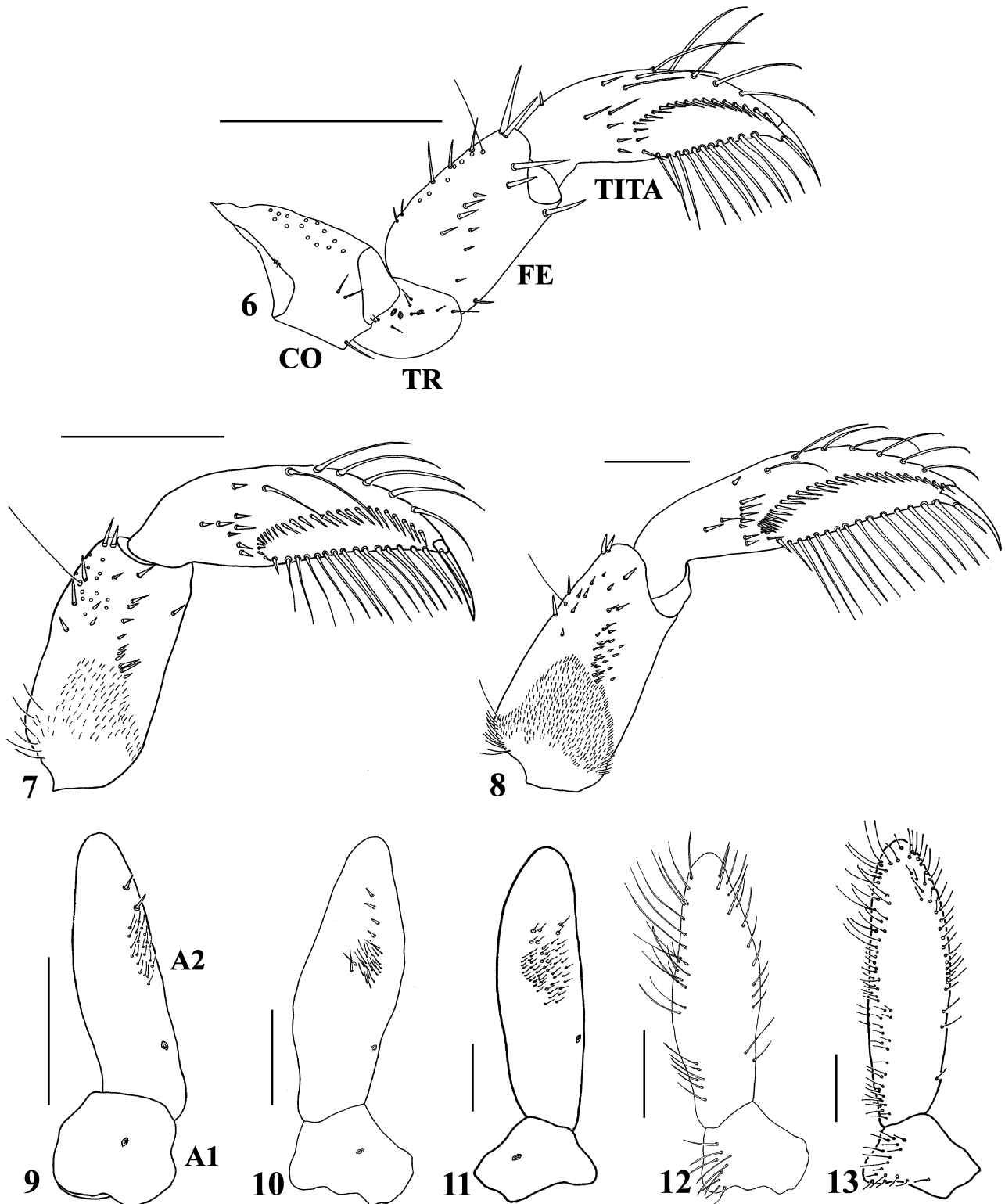
Similar to first instar except for the following features.

**Colour.** Generally darker than previous instar. Mesotarsus, metatibia, and metatarsus darker apically. Metapleura with dark patches.

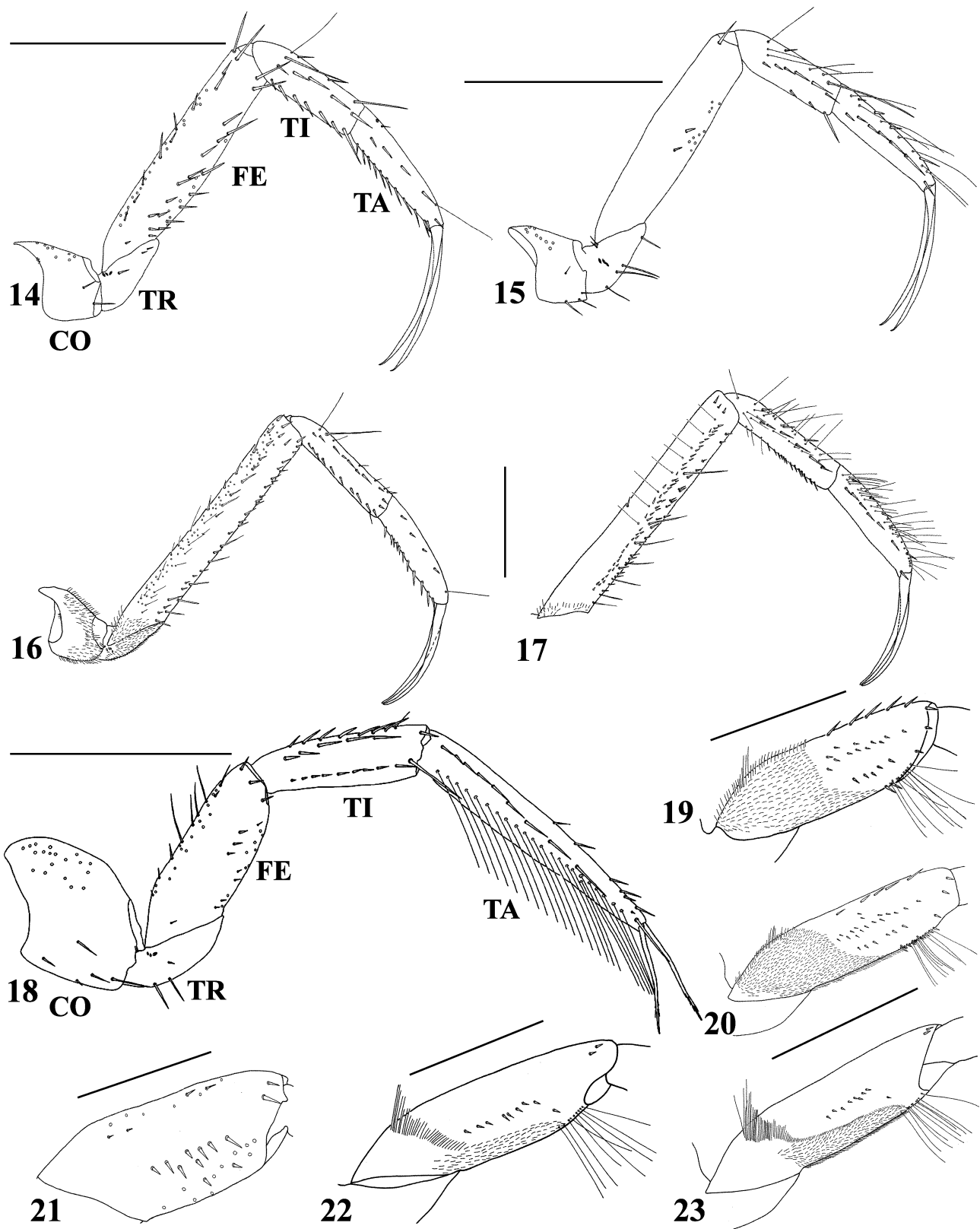
**Body.** Ratio of body length/width: 1.38 (Fig. 2).

**Head.** Ratio of HL/HW: 0.38; ecdysial line as previous instar but shorter, only reaching half of metanotum; with chloride cells. S/eW: 1.33. OI: 1.23. HW/BL: 0.58. *Rostrum* with four transverse sulcations. *Antenna* (Fig. 9): AL/BL: 0.14; A1:A2= 0.25:1.00; ratio of A2 width/length: 0.38.

**Thorax.** Mesonotum as long as or longer than pronotum; postero-lateral margins rounded; with scattered short slender setae. Metanotum with scattered short slender setae; with chloride cells grouped in two areas by

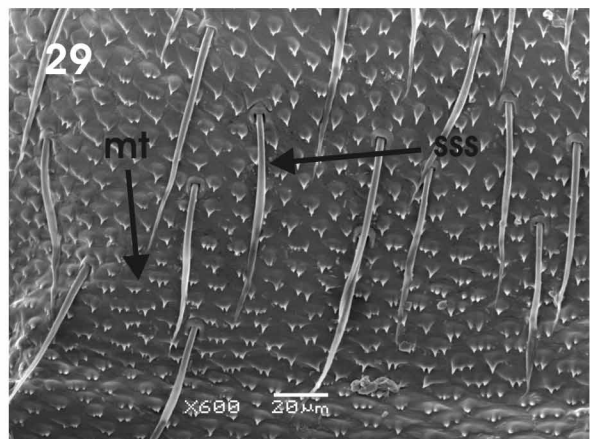
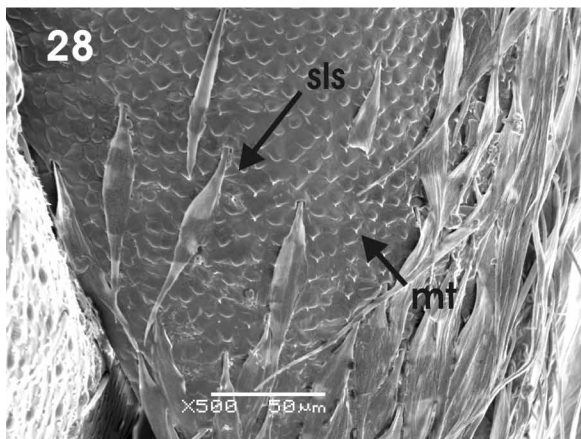
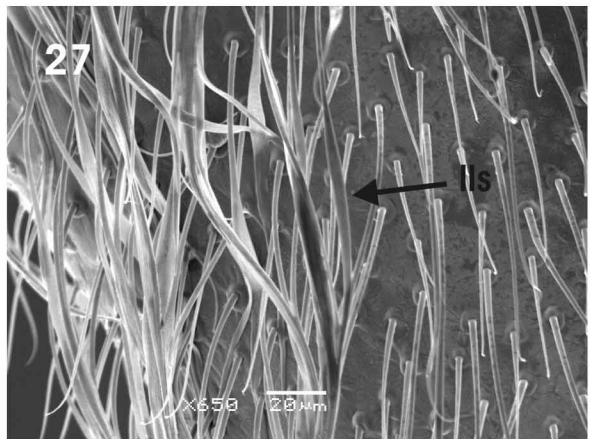
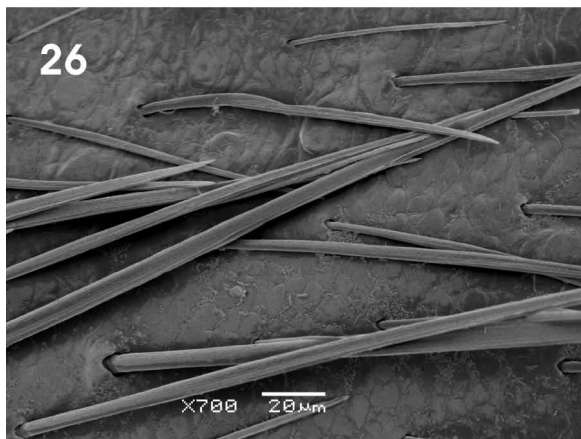
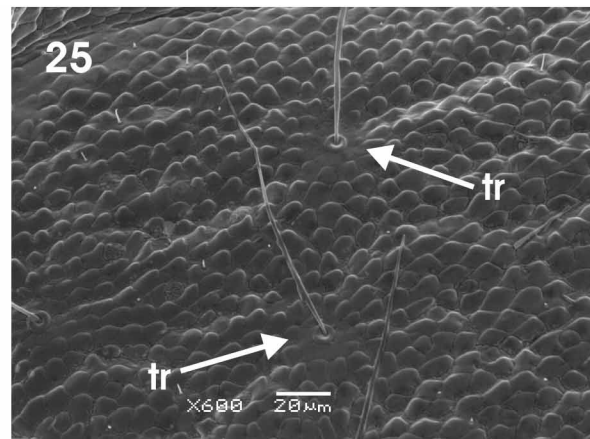
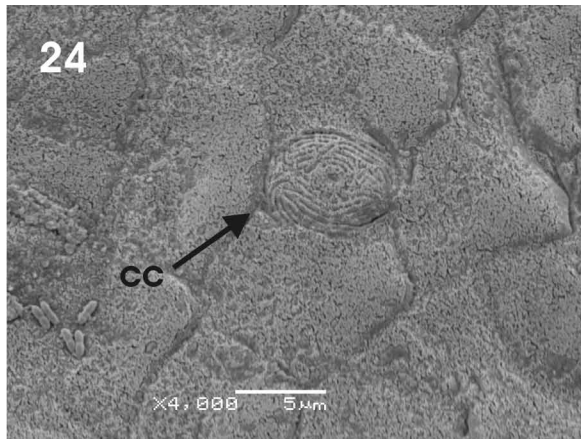


**FIGURES 6–13.** *Ectemnostega (Ectemnostegella) montana* (Lundblad). **6**—Anterior leg of first instar, anterior view; **7**—Anterior leg of third instar, anterior view; **8**—Anterior leg of fifth instar, anterior view; **9**—Left antenna of second instar, anterior view; **10**—Left antenna of third instar, anterior view; **11**—Right antenna of fifth instar, anterior view; **12**—Left antenna of third instar, posterior view; **13**—Right antenna of fifth instar, posterior view. Scale bars: Figs. 6–8= 0.30 mm, Figs. 9–13= 0.10 mm.



**FIGURES 14–23.** *Ectemnostega (Ectemnostegella) montana* (Lundblad). **14**—Mesoleg of first instar, anterior view; **15**—Mesoleg of first instar, posterior view; **16**—Mesoleg of third instar, anterior view; **17**—Mesoleg of third instar, posterior view; **18**—Metaleg of first instar, anterior view; **19**—Metafemur of third instar, anterior view; **20**—Metafemur of fifth instar, anterior view; **21**—Metafemur of first instar, posterior view; **22**—Metafemur of third instar, posterior view; **23**—Metafemur of fifth instar, posterior view. Scale bars: Figs. 14–19, 22= 0.50 mm, Figs. 20, 23 = 1.00 mm, Fig. 21 = 0.25 mm.





**FIGURES 24–29.** *Ectemnostega (Ectemnostegella) montana* (Lundblad), fifth instar. **24**—Chloride cell on frons; **25**—Trichobothria on dorsal region of head; **26**—Setae on frons; **27**—Setae on inner margin of mesothoracic wing pad; **28**—Spatulate setae on metathoracic wing pad; **29**—Microtrichia and setae on metanotum. cc: chloride cell; tr: trichobothria; lls: long lanceolate setae; sls: short lanceolate setae; mt: microtrichia; sss: short slender setae.

the sides. PL/BL: 0.31. *Anterior legs*: L1/BL: 0.46–0.50; profemur shorter than tibiatarus, FE1/TITA: 0.67–0.79. *Procoxa*: anterior region with long slender setae; posterior region with scattered short slender setae, and a campaniform sensillum apically; antero- and postero-dorsal regions without chloride cells. *Protrochanter*: posterior region with three campaniform sensilla basally, and a long slender setae. *Profemur*: anterior region with nine spines (five short and slender, and four long and stout); posterior region with a long stout spine, and two short slender setae apically; dorsal region with several short slender setae on basal half. *Tibiatarus*: ratio

of TITA width/length: 0.33; upper row with 22 short stout spines; lower row with 15 long slender spines; anterior region with tibial comb including three slender spines (one short, and two long), basal region with one short slender spine. CL length: 0.15. *Mesolegs*: L2/BL: 0.89; mesofemur longest, mesotibia longer than mesotarsus; FE:TI:TA=1.00:0.56:0.44. *Mesocoxa*: anterior region with four long slender setae apically; antero-dorsal region without chloride cells; posterior region with two long slender setae apically; postero-dorsal region without chloride cells. *Mesotrochanter*: anterior region with two short stout, and four short slender setae basally. *Mesofemur*: antero-dorsal region with 22 short and long slender spines; antero-ventral region with 24 short and long stout spines; postero-dorsal region with a short stout spine apically; postero-ventral region with 14 short spines, and seven long spines; dorsal region with four long slender setae; ventral region with 26 short stout and long slender spines. *Mesotibia*: anterior region with four campaniform sensilla, and a short slender spine apically; posterior region with 14 long slender setae; postero-ventral region with tibial comb including four short slender spines, and a row of seven short slender spines. *Mesotarsus*: postero-dorsal region with 13 long slender setae. CL1 length: 0.49; CL2 length: 0.50; TA2/CL1: 0.70; TA2/CL2: 0.71. *Metalegs*: L3/BL: 1.17; FE:TI:TA=0.88:0.59:1.00. *Metacoxa*: antero-dorsal region without chloride cells. *Metatrochanter*: anterior region with six short slender spines; posterior region with three campaniform sensilla basally. *Metafemur*: posterior region with nine short stout spines. *Metatibia*: ratio of TI3 width/length: 0.20; anterior region with a lower row of 13 short slender spines, and a short slender spine apically; antero-dorsal region with ten long slender spines; posterior region with 10–11 long slender setae, and a row of eight slender spines (three short and five long); postero-ventral region with six short stout spines, three long slender spines, and the tibial comb including 3–4 long slender spines. *Metatarsus*: ratio of TA3 width/length: 0.12; anterior region with a row of 52 long slender setae, and a row of seven long slender spines; antero-ventral region with a row of 22 long slender spines; posterior region with an upper row of nine long slender setae, and a lower row of 65–71 long slender setae. CL1 length: 0.25; CL2 length: 0.26; TA3/CL1: 3.27; TA3/CL2: 3.40.

**Abdomen.** Posterior margin of tergite I straight, rest of segments with posterior margins slightly concave; spiracles visible on segments I–VIII. Terga with short slender setae. Laterotergites with microtrichia, chloride cells, and short slender setae. Lateral setae on abdominal segments IV–VIII slender; IV: four short setae, and one long setae; V: six short setae, one long setae, and one median setae; VI: six short setae, and one long setae; VII: six short setae, and two long setae; VIII: four short setae, six long setae, and two median setae. Sternite IV unarmed.

**Third instar.** (Figs. 3, 7, 10, 12, 16–17, 19, 22) (n = 3)

Similar to second instar except for the following features.

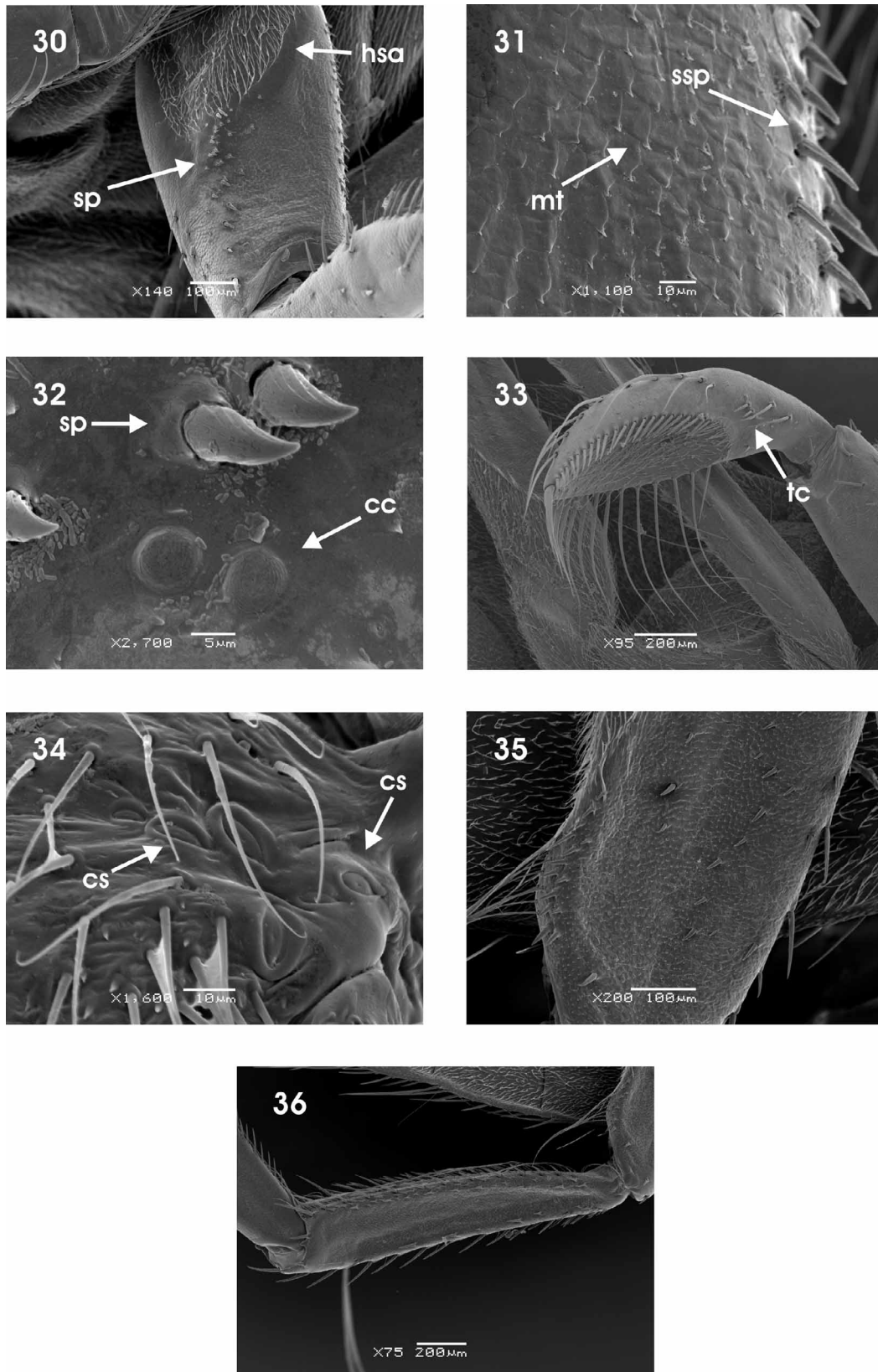
**Colour.** Darker than previous instar, including the setae. Abdominal terga with a pair of dark patches separated medially on segments III–VII.

**Body.** Ratio of BL/BW: 1.55–1.85 (Fig. 3).

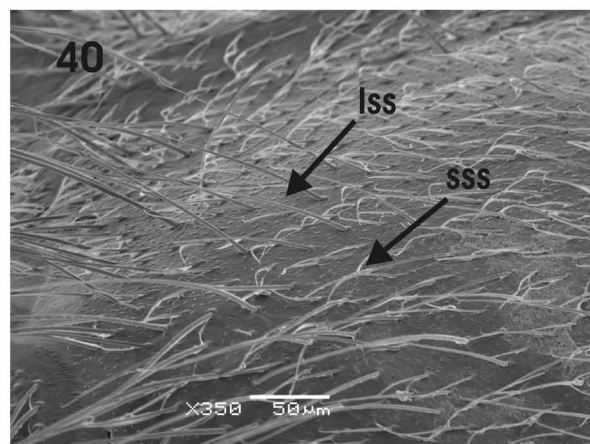
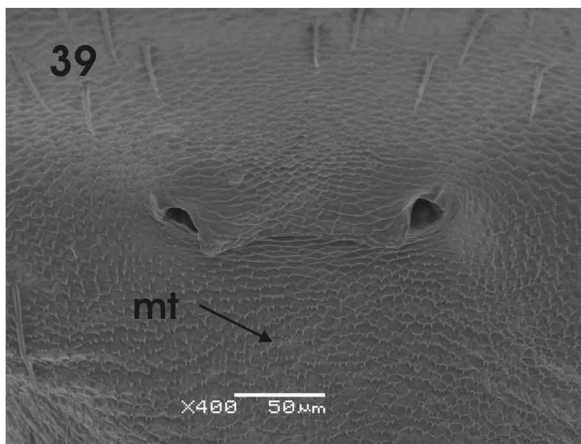
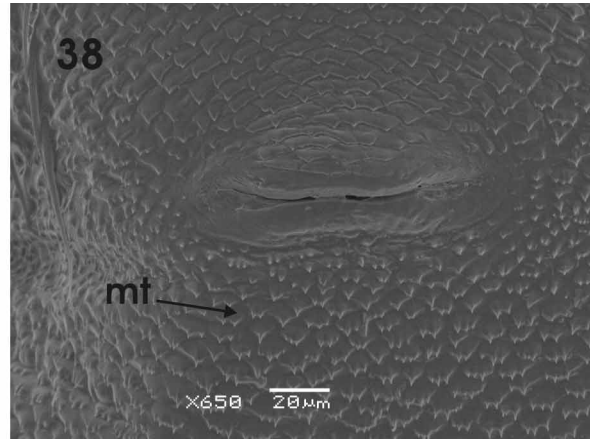
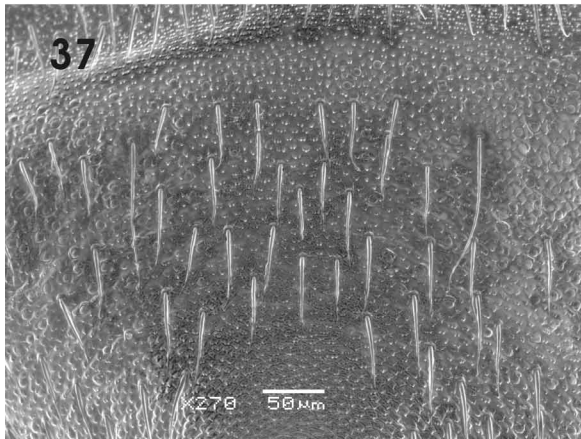
**Head.** Ratio of HL/HW: 0.34–0.36; without microtrichia. S/eW: 1.38–1.55. OI: 1.22–2.00. HW/BL: 0.56–0.60. Frons with trichobothria; clypeous with abundant long slender setae. *Rostrum* with six transverse sulcations. Posterior margin of eyes slightly concave. *Antenna* (Figs. 10, 12): AL/BL: 0.15–0.16; A1:A2=0.17–0.23:1.00; segment I: postero-dorsal region with long slender setae; ratio of A2 width/length: 0.31–0.33, postero-dorsal and postero-ventral regions of antennal segment II (except basal third) with long slender setae, apical third with longer setae dorsally.

**Thorax.** *Pronotum* mostly hidden by head, visible at the posterior margin; anterior margin convex at middle, lateral and posterior margins straight. Posterior half of segment at middle with short slender setae; latero-posterior and posterior margins with long slender setae. Prosternum with abundant short slender setae. *Mesonotum* shorter than metanotum and longer than pronotum; with abundant short slender setae; lateral and posterior margins of wing pads with long slender straight setae; lateral inner margin of wing pads with long slender curved setae intermixed with long lanceolate setae; with a transversal line of short lanceolate setae produced medially to posterior margin of segment, but not reaching it. Mesosternum with abundant short slender setae. Posterior margin of metanotum straight; lateral margin of metathoracic wing pads with long slender straight setae; rest of wing pads with short slender setae; metanotum with abundant short slender

setae; anterior margin glabrous, with microtrichia; antero-lateral region of metathoracic wing pads without microtrichia or chloride cells. Metasternum with abundant short slender setae. Metaxyphus a little wider than long (ML/MW: 0.80). Mesothoracic wing pads reaching half of metathoracic ones; the latter reaching posterior margin of segment I. PL/BL: 0.18–0.29. Meso- and metathoracic spiracles elongate; mesothoracic spiracle larger than metathoracic one, the latter larger than abdominal spiracles. Mesothoracic spiracle located latero-ventrally near anterior margin of segment; metathoracic spiracle located laterally, near anterior margin of segment. *Anterior legs* (Fig. 7): L1/BL: 0.44; profemur shorter than tibiatarsus, FE1/TITA: 0.75–0.83. *Procoxa*: anterior region with abundant short and long slender setae; posterior region with two campaniform sensilla apically. *Protrochanter*: anterior region with abundant short and long slender setae. *Profemur*: anterior region with 13 spines (ten short and stout, and three long slender), one long stout spine apically, hydrophobic setose area on basal half of anterior and posterior regions. *Tibiatarsus*: ratio of TITA width/length: 0.25–0.33; upper row with 28 short stout spines; lower row with 16 long slender spines; anterior region with two slender spines (one short and one long). CL length: 0.19. *Mesolegs* (Figs. 16–17): L2/BL: 0.94–0.98; mesofemur longer and mesotarsus shorter than mesotibia; FE:TI:TA=1.00:0.42–0.46:0.31–0.42. *Mesocoxa*: anterior region with four short setae basally, and abundant short and long slender setae; posterior region with abundant short and long slender setae. *Mesotrochanter*: anterior region with four campaniform sensilla basally, and abundant short and long slender setae; posterior region with five campaniform sensilla medially, and abundant short and long slender setae. *Mesofemur*: anterior region with a basal hydrophobic setose area; antero-dorsal region with 17 short and long slender setae, and 12 short and long slender spines; antero-ventral region with 29 short and long stout spines, and a long stout spine apically; posterior region with an hydrophobic setose area basally, and a row of eight long slender setae; postero-ventral region with seven–eight long slender setae, and 48 short and long stout spines; ventral region with 23 short stout and long slender spines. *Mesotibia*: anterior region with a row of eight short and long slender spines, and two slender spines apically (one short and one long); antero-dorsal region with five long slender setae; antero-ventral region a row of ten long slender spines; posterior region with 21 long slender setae; postero-dorsal region with three short slender spines; postero-ventral region with three long slender setae basally, and a row of 14 short and long slender spines, tibial comb including five long slender spines. *Mesotarsus*: postero-dorsal region with 29 long slender setae. CL1 length: 0.61; CL2 length: 0.64; TA2/CL1: 0.63; TA2/CL2: 0.65. *Metalegs*: L3/BL: 1.12–1.14; metatarsus and metatibia shorter than metafemur; FE:TI:TA= 0.71–0.78:0.61–0.63:1.00. *Metacoxa*: anterior region with two long slender spines medially, and abundant short and long slender setae; antero-ventral region with a group of short and stout spines medially; posterior region with abundant short and long slender setae. *Metatrochanter*: anterior region with four campaniform sensilla basally, and abundant short and long slender setae; posterior region with five campaniform sensilla medially, and abundant short and long slender setae. *Metafemur* (Figs. 19, 22): anterior region with an hydrophobic setose area basally occupying more than half of article, with three short and stout spines apically, an upper region of 10–12 short spines and a lower region of 5–6 short spines; antero-dorsal region with five long slender spines; antero-ventral region with two short stout spines; posterior region with 9–10 short stout spines, and an hydrophobic setose area basally occupying more than half of the article; ventral region with nine long slender setae. *Metatibia*: ratio of TI3 width/length: 0.20; anterior region with an upper row of seven long slender spines, and a lower row of 15 of short slender spines; antero-dorsal region with 15 short and long slender spines, and seven long slender setae; antero-ventral region with a row of 28 long slender setae; posterior region with an upper row of 4 long slender setae (one basally and three apically), one lower row of 15 long slender setae, and a row of eight long slender spines; postero-ventral region with 29 spines (27 short and stout, and two long and slender), tibial comb including five long slender spines. *Metatarsus*: ratio of TA3 width/length: 0.12; anterior region with a row of 189 long slender setae, and a row of eight long slender spines; antero-dorsal region with a row of nine long slender setae; antero-ventral region with a row of 26 short and long slender spines; posterior region with an upper row of 10 long slender setae, and a lower row of 253 long slender setae; postero-dorsal region with 37 short and long slender spines; postero-ventral region with a row of 49 short and long slender spines. CL1 length: 0.18; CL2 length: 0.19; TA3/CL1: 6.05; TA3/CL2: 6.39.



**FIGURES 30–36.** *Ectemnostega (Ectemnostegella) montana* (Lundblad), fifth instar. **30**—Profemur, anterior view; **31**—Microtrichia and spines on profemur, dorsal view; **32**—Chloride cells and spines on profemur, postero-ventral view; **33**—Spines on tibiatarsus, anterior view; **34**—Campaniform sensilla on basal region of mesotrochanter; **35**—Microtrichia, spines, and setae on metafemur, apical anterior view; **36**—Metatibia, anterior view. hsa: hydrophobic setose area; sp: spines; ssp: stout spines; mt: microtrichia; cc: chloride cell; tc: tibial comb; cs: campaniform sensillum.



**FIGURES 37–40.** *Ectemnostega (Ectemnostegella) montana* (Lundblad), fifth instar. **37**—Microtrichia and setae on abdominal terga, anterior region; **38**—First scent gland openings; **39**—Second scent gland openings; **40**—Setae on abdominal sterna. mt: microtrichia; lss: long slender setae; sss: short slender setae.

**Abdomen.** Scent glands (G3: 0.05; G4: 0.13; G5: 0.10); spiracles of segment I located ventrally at middle of the segment, larger than rest of spiracles; spiracles of segments II–VIII located ventrally near anterior margin of each segment. Terga: with abundant chloride cells, and short slender setae; segments III–VIII with a pair of long slender setae medially (on segment III located on anterior half, on the other segments located on posterior half, near posterior margin); segment VIII with short and long slender setae. Lateral setae on abdominal segments IV–VIII with slender setae; IV: four short setae, and two long setae; V: three short setae, and two long setae; VI: six short setae, and three long setae; VII: eight short setae, and three long setae; VIII: eight short setae, seven long setae, one median setae, one short setae, and one median setae on posterior margin. Sterna with abundant short slender setae, and scattered long slender setae on last abdominal segments; without chloride cells. Sternite V unarmed; sternites VI and VII with two long slender spines medially near posterior margin; sternite VIII with two short slender spines medially, before the proctiger near anterior margin.

**Fourth instar.** (Fig. 4) (n= 6)

Similar to third instar except for the following features.

**Colour.** Posterior margin of head dark. Mesonotum with two small rounded pale patches at middle. Sterna darker than previous instar; acetabulae brown with dark patches. Metaxyphus dark brown. Mesolegs: posterior region of mesofemur and mesotibia brown distally; metatarsus brown, except apex darker; claws darker. Metalegs: posterior apical region of metafemur, and posterior region of metatibia and metatarsus brown, base and apex of metatibia darker. Abdomen: segment I light brown; anterior margin of segment II

pale, with two small suboval pale patches medially; segments III–VII brown with a pair of dark patches; segments VII–VIII with a dark patch medially; scent glands darker.

**Body.** Ratio of BL/BW: 1.67–1.75 (Fig. 4).

**Head.** Ratio of HL/HW: 0.30–0.33; posterior margin slightly excavated at middle; latero-posterior margin expanded covering latero-posterior margin of pronotum. S/eW: 0.93–1.25. OI: 1.13–1.36. HW/BL: 0.53–0.54. *Rostrum* with eight transverse sulcations. Posterior margin of eyes more concave than previous instar. *Antenna*: AL/ BL: 0.12–0.14; A1:A2= 0.12–0.13:1.00; ratio of A2 width/length: 0.29–0.33, postero-ventral region of antennal segment II with long slender setae on basal third.

**Thorax.** Mesonotum longer than pronotum, but shorter than metanotum. Transversal line with long lanceolate setae. *Metanotum*: latero-posterior and posterior margins of wing pads with long slender curved setae; inner margin of wing pads with long slender curved setae intermixed with long lanceolate setae. Metaxyphus as long as wide (ML/MW: 1.00). Mesothoracic wing pads reaching posterior margin of abdominal tergite I; metathoracic wing pads slightly surpassing anterior margin of segment II. PL/ BL: 0.26–0.29. *Anterior legs*: L1/BL: 0.39–0.41; profemur shorter than tibia, FE1/TITA: 0.65–0.73. *Procoxa*: anterior region with five short setae basally. *Protrochanter*: anterior region with four short setae basally, five (4+1) campaniform sensilla basally, and two short slender setae basally; posterior region with abundant short and long slender setae, and four campaniform sensilla basally. *Profemur* subrectangular and flattened antero-posteriorly; anterior region with 25 spines (20 short and stout, five long and slender); postero-ventral region with several short spines; dorsal region with two long slender spines. *Tibia*: ratio of TITA width/length: 0.24–0.27; upper row with 26–28 short stout spines; lower row with 15–18 long slender spines; tibial comb including four slender spines (one short and three long), base of tibia with two long slender spines. CL length: 0.24. *Mesolegs*: L2/BL: 0.98–1.04; FE:TI:TA=1.00:0.40–0.46:0.33–0.38. *Mesocoxa*: anterior region with five short setae basally. *Mesotrochanter*: anterior region with five campaniform sensilla basally, and four short setae basally; posterior region with seven campaniform sensilla medially. *Mesofemur*: antero-dorsal region with 15 short and long slender setae, and 25 short and long slender spines, without chloride cells; antero-ventral region with 33 short and long stout spines, without chloride cells; posterior region with a row of 18 long slender setae; postero-ventral region with 68 short and long stout spines, without chloride cells; ventral region with 47 short, stout, and long slender spines. *Mesotibia*: anterior region with a row of 11 short and long slender spines; antero-ventral region with a row of 15 long slender spines; posterior region with 30 long slender setae; postero-ventral region with a row of 27 short and long slender spines, tibial comb including six long slender spines. *Mesotarsus*: postero-dorsal region with 35 long slender setae. CL1 length: 0.70; CL2 length: 0.72; TA2/CL1: 0.97; TA2/ CL2: 1.00. *Metalegs*: L3/BL: 1.06–1.19; metatarsus longer and metatibia shorter than metafemur; FE:TI:TA=0.73–1.00:0.58–0.66:1.00. *Metacoxa*: antero-ventral region with a group of long slender spines at middle region of segment. *Metatrochanter*: anterior region with five campaniform sensilla basally; posterior region with six campaniform sensilla medially. *Metafemur*: anterior region with an upper region of 14 short spines, and a lower region of nine short spines; antero-ventral region with ten short stout spines, without chloride cells; posterior region with nine short stout spines. *Metatibia*: ratio of TI3 width/length: 0.20; anterior region with an upper row of ten long slender spines, and a lower row of 25 short and long slender spines; antero-dorsal region with 19 short and long slender spines, and nine long slender setae; antero-ventral region with a row of 40 long slender setae; posterior region with a lower row of 28 long slender setae; postero-ventral region with 31 short stout, and long slender spines, tibial comb including seven long slender spines. *Metatarsus*: ratio of TA3 width/length: 0.12; anterior region with a row of 318 long slender setae, and a row of nine long slender spines; antero-dorsal region with a row of eight long slender setae; antero-ventral region with a row of 29 short and long slender spines; posterior region with an upper row of nine long slender setae, and a lower row of 416 long slender setae; postero-dorsal region with 36 short and long slender spines; postero-ventral region with a row of 47 short and long slender spines. CL1 length: 0.21; CL2 length: 0.22; TA3/CL1: 6.82; TA3/CL2: 7.14.

**Abdomen.** Posterior margin of tergite I straight; posterior margin of tergites IV and V concave; tergites of rest of segments slightly concave. Posterior margin of sternite I convex; posterior margin of rest of segments

slightly concave; scent gland on segment III reduced. Spiracles: segment I, lateral, located near anterior margin; segments II–VIII, ventral, located near anterior margin of each segment. Terga with microtrichia. Lateral setae on abdominal segments IV–VIII slender; IV: five short setae, and two long setae; V: six short setae, and four long setae; VI: six short setae, and four long setae; VII: nine short setae, and six long setae; VIII: ten short setae, eight long setae, and two long setae on posterior margin. Sternites: sternite VIII with abundant short and long slender setae.

**Fifth instar.** (Figs. 5, 8, 11, 13, 20, 23–40) (n= 6)

Similar to fourth instar except for the following features.

**Colour.** Posterior and lateral inner margins of metathoracic wing pads dark brown. Posterior region of metatarsus darker apically.

**Body.** Ratio of BL/BW: 1.73–2.12 (Fig. 5).

**Head** (Figs. 24–26). Ratio of HL/HW: 0.32–0.40. S/eW: 0.80–1.11. OI: 1.00–1.33. HW/BL: 0.45–0.48. Rostrum with ten transverse sulcations. *Antenna* (Figs. 11, 13): AL/BL: 0.09–0.10; A1:A2= 0.22–0.25:1.00; ratio of A2 width/length: 0.22–0.25.

**Thorax.** Mesonotum as long as metanotum, and longer than pronotum. Posterior and lateral inner margins of mesothoracic wing pads with long slender curved setae intermixed with long lanceolate setae (Fig. 27); transversal line with long lanceolate setae produced medially to posterior margin of mesonotum, reaching it. Metanotum (Fig. 29): posterior and lateral inner margin of metathoracic wing pads with long slender curved setae intermixed with long lanceolate setae (Fig. 28). Metaxyphus longer than wide (ML/MW: 1.18). Mesothoracic wing pads covering metathoracic ones; the latter reaching anterior half of abdominal tergite III. PL/BL: 0.27–0.28. *Anterior legs* (Fig. 8): L1/BL: 0.36–0.40; FE1/TITA: 0.75–0.82. *Procoxa*: anterior region with six short setae basally. *Protrochanter*: anterior region with five short setae basally; posterior region with five campaniform sensilla basally. *Profemur* (Figs. 30–32): anterior region with 37–39 spines (33 short and stout, and six long and slender); postero-ventral region with more abundant short spines than previous instar. *Tibiatarsus* (Fig. 33): ratio of TITA width/length: 0.17–0.18; upper row with 30–31 short stout spines; lower row with 15–16 long slender spines; anterior region with tibial comb including five slender spines (one short and four long). CL1 length: 0.33. *Mesolegs*: L2/BL: 0.91–1.00; FE:TI:TA=1.00:0.40–0.41:0.31–0.33. *Mesocoxa*: anterior region with six short setae basally. *Mesotrochanter*: anterior region with five short setae basally, and six campaniform sensilla basally (Fig. 34); posterior region with nine campaniform sensilla at middle. *Mesofemur*: antero-dorsal region with 29 short and long slender setae, and 23 short and long slender spines; antero-ventral region with 48 short and long stout spines; posterior region with a row of 37 long slender setae, and four short slender setae apically; postero-ventral region with 123 short and long stout spines; ventral region with 53 short stout, and long slender spines. *Mesotibia*: anterior region with a row of 10 short and long slender spines; antero-ventral region with a row of 14 long slender spines; posterior region with 50 long slender setae; postero-ventral region with a row of 46 short and long slender spines, tibial comb including 6–7 long slender spines. *Mesotarsus*: postero-dorsal region with 60 long slender setae; ventral region with 11 long slender spines. CL1 length: 0.77; CL2 length: 0.93; TA2/CL1: 0.97; TA2/CL2: 1.17. *Metalegs*: L3/BL: 0.96–1.04; metatarsus longer, and metatibia shorter than metafemur; FE:TI:TA=0.70:0.61–0.65:1.00. *Metatrochanter*: anterior region with six campaniform sensilla basally; antero-ventral region with 2–3 long slender setae basally; posterior region with 7–9 campaniform sensilla medially. *Metafemur* (Figs. 20, 23, 35): anterior region with an upper region of 17–19 stout and slender short spines, and a lower region of 6–7 stout and slender short spines; antero-dorsal region with 5–6 slender spines (five long and one short); antero-ventral region with 14–16 short stout spines; posterior region with 8–9 short stout and slender spines; ventral region with 10–11 long slender setae. *Metatibia*: ratio of TI3 width/length: 0.20; anterior region with an upper row of 13 short and long slender spines, and a lower row of 42 short and long slender spines (Fig. 36); antero-dorsal region with 24 short and long slender spines, and 11 long slender setae; antero-ventral region with a row of 50 long slender setae; posterior region with a lower row of 46–47 long slender setae; postero-ventral region with 30 short stout, and long slender spines, tibial comb including eight long slender spines. *Metatarsus*: ratio of TA3 width/length: 0.12; anterior region with a row of 450 long slender setae, and

a row of eight long slender spines; antero-dorsal region with a row of 8–9 long slender setae; antero-ventral region with a row of 30 short and long slender spines; posterior region with an upper row of 11 long slender setae, and a lower row of 606 long slender setae; postero-ventral region with a row of 49 short and long slender spines. CL1 length: 0.25; CL2 length: 0.26; TA3/CL1: 8.85; TA3/CL2: 9.20.

**Abdomen** (Figs. 37–40). Posterior margin of tergites and sternites slightly concave. Lateral setae on abdominal segments IV–VIII slender; IV: five short setae, and two long setae; V: six short setae, two median setae, and one long setae; VI: six short setae, and three long setae; VII: six short setae, five long setae, and one median setae; VIII: eight short setae, and 15 long setae. Sternite VIII with abundant long slender setae.

## Discussion

The eggs of Corixidae are ovoid or top-shaped and slightly asymmetrical with one side more convex than the other; and they are attached to their support by a button-like disk (Hungerford 1948a, Cobben 1968, Stonedahl & Lattin 1986). In most of the species between the disk and the egg there is a very short stem, but in some genera (e.g., *Cymatia*, *Heterocorixa*, *Agraptocorixa*, and *Tenagobia*) the egg is supported on a stalk of considerable length (Hungerford 1948a, b). In the subgenus *Ectemnostegella* the eggs are known only from *E. (E.) peruana* (Jacsewski) (Hungerford 1948b); they are elongate and oval without any sculpturation and with a very short stalk. We found that the eggs of *E. (E.) montana* have a slightly different shape, and an hexagonal sculpturation, but the stem is also very short.

Chloride cells are known to be osmoregulatory cells, with the main function of absorption of electrolytes from the external medium. They are found in aquatic insects such as Ephemeroptera, Plecoptera, and Heteroptera. They normally occur on body sites that are in direct contact with the surrounding water, whereas those parts that are covered by respiratory air films or wings are devoid of chloride cells. So, their distribution may vary during ontogenetic development depending on the onset of plastron respiration.

Chloride cells have been studied in Notonectidae, Naucoridae, Corixidae, Nepidae, and Pleidae (Komnick 1977). In Corixidae, only two species were studied: *Hesperocorixa sahlbergi* (Fieber) (Komnick & Wichard 1975) and *Corixa punctata* Illiger (Komnick & Schmitz 1976). The results of these studies demonstrated that during first and second instar, chloride cells are located on the ventral and dorsal side of the abdomen; after molting to the third instar, when plastron respiration begins, they are no longer observed on the abdominal sternites. The loss from the sternites is overcompensated by a large increase in the number on the abdominal tergites. From the second instar to adulthood, the chloride cells appear over the dorsal side of the thorax and head. In the winged adult, as in *Corixa punctata*, they are no longer present on the dorsal side of the abdomen and thorax, and they appear to be restricted to the legs and head, being the only parts exposed to water (Komnick and Schmitz 1976).

In *E. (E.) montana* we observed that in the first instar chloride cells predominate on abdominal terga and sterna, and on the proximal regions of the legs (coxa and femur); in the second instar they appear on the head and metanotum, are retained on abdominal terga and sterna, and on the femoral region of the legs, but they disappear from the coxal region. After the third molt, chloride cells are found on the frons of the head, metanotum, and abdominal terga where they are very abundant; they are retained on the femora, and disappear from the abdominal sterna. In the last two instars, the chloride cells present a similar distribution to the third instar except for retaining them only on the profemora. This pattern of distribution of chloride cells is very similar to that described for *H. sahlbergi* (Komnick & Wichard 1975), except for the presence of chloride cells on the legs.

The five instars of *E. (E.) montana* can be identified down to species on the basis of the chaetotaxy of the tibiarsus (dorsal row with 7–9 long and slender setae), and the ratio between the synthlipsis and the width of an eye, which is close to or greater than 1.00; but only the larval instars III–V can be identified on the basis of the extent of the basal hydrophobic setose area and the abundant spines on the anterior region of the profemur.



Several of the descriptions of larvae of Corixidae found in the literature are rather superficial. They need to be assessed from a more detailed approach, such as the study of chaetotaxy and morphometry. In view of the fact that no previous work has done this for *Ectemnostega*, comparisons among described larvae are difficult.

Up to now, only the larvae of one species of this genus have been studied *E. (E.) quadrata* (Signoret 1885) (Scheibler & Melo 2009). The larvae of *E. (E.) montana* can be distinguish from this species by the presence of abundant short spines on the ventral and anterior regions of the profemur, the presence of two lateral projections on the scent gland openings 2 and 3, the longer and slender lanceolate setae on mesothoracic wing pads; and by the absence of a projection on the distal region of the profemur. Both species present similar chaetotaxy on metafemur.

The characters which are similar in the first two instars of *E. (E.) montana* and *Cenocorixa bifida* (Hungerford) described by Scudder (1966) are the number of spines on the lower row of the tibiatarus (12–14 spines in instar I; 14–15 in instar II); but they differ considerably in the number of spines of the lower row of the tibiatarus of the last three instars and on the chaetotaxy of the profemur and metatibia of all instars. Besides, *E. (E.) montana* differs considerably from the five instars of *C. expleta* (Uhler) (Scudder 1966) on the chaetotaxy of the tibiatarus, profemur and metatibia.

The five instars of *E. (E.) montana* can be easily separated on the basis of: body length; the absence (instars I–II) or presence (instars III–V) of wing pads and the grade of development of them; and the chaetotaxy of the pterothorax; the three pairs of legs (number of spines on the tibial comb of the tibiatarus, meso- and metatibia; number of spines on the upper and lower rows of the tibiatarus; absence (instars I–II) or presence (instars III–V) of the basal hydrophobic setose area on pro-, meso-, and metafemur), and the abdominal sterna (sternites IV–VIII). Some of these characters (chaetotaxy of the thorax, metafemur, and metatibia; and the grade of development of the wing pads) were used by Scudder (1966) to separate the five instars of *C. bifida* and *C. expleta*, and by Jansson (1969) to separate the five instars of 27 North European species of Corixidae belonging to the subfamilies Micronectinae, Cymatiinae, and Corixinae. Other useful measures to separate larval instars are the ocular index, and the ratio between the length of the claws and the length of meso- and metatarsus, respectively.

The analysis presented here should be considered a preliminary study of the morphometry and chaetotaxy of members of *Ectemnostega*, based on larval characters. Further research on other species of the same genus is needed. Otherwise, larval morphology and chaetotaxy within the subfamily Corixinae are still poorly known, and the descriptions do not include sufficient details of these structures. Future studies should focus on providing good descriptions of the larvae of this subfamily, which will improve the resolution of future analyses of the phylogeny of the Corixidae.

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